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ABSTRACT

The explosion of information and the popularity of the Internet and commercial search engines have required librarians to take a fresh look at their profession. The overwhelming amount of information now available has brought new demands and expectations. The need to bring information to the remote user has encouraged the creation of many innovative services linking new technology with traditional library services. How do librarians build on their age-old status as trusted advisors and create services that will both meet demand and revitalize the profession? How do we take the reference desk to cyberspace? The Collaborative Digital Reference Service (CDRS) launched by the Library of Congress and partner libraries is one response to these questions. CDRS provides professional reference service to users any time and anywhere through an international digital network of libraries. This paper explores how CDRS began and what lies ahead for this and other innovative e-reference services. (Author/MES)

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Library quality reference meets the World Wide Web

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Abstract:

The explosion of information and the popularity of the Internet and commercial search engines have required librarians to look afresh at their profession. With the overwhelming amount of information now available has come new demands and expectations. The need to bring information to the remote user has encouraged the creation of many innovative services linking new technology with traditional library services. How do librarians build on their ages-old status as trusted advisors and create services that will both meet demand and revitalize the profession? How do we take the reference desk to cyberspace? The Collaborative Digital Reference Service (CDRS) launched by the Library of Congress and partner libraries is one such response. CDRS provides professional reference service to users anytime anywhere through an international digital network of libraries. This paper explores how CDRS began and what lies ahead for this and other innovative E-reference services.

Brave New World

The world of the reference librarian is changing; list serves are crammed with queries from librarians seeking advice on setting up 24/7 live reference and chat services, job announcements search for "energetic" "dynamic" and "highly motivated individuals" to lead teams in implementing "innovative tools and services." Cybrarian versus librarian debates abound.

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Workshops and training classes instruct librarians in the art of providing distance reference to wherever the patron may be. At recent meetings of the American Library Association (ALA), the virtual library was very much in evidence featuring panel discussions and several demonstrations of live chat software which many libraries are experimenting with. Throughout ALA and other professional meetings, the virtual library has been demonstrated, evaluated, and ultimately validated as scores of librarians share their personal experiences in evolving traditional services into the online environment without sacrificing quality or accuracy. But we didn't just get there overnight.

Digital reference has been evolving over the last several years. According to an article by Bernie Sloan, Senior Library Information Systems Consultant, the University of Illinois Office for Planning and Budgeting, that was recently posted to DIG_REF, a list serve that addresses online reference, the first widespread use of technology in support of digital reference services was email with articles about such services appearing in several professional journals in the early 1990's.

The use of MUDs and MOOs, interactive environments where users could exchange information, for reference services appeared in the mid 1990s, at about the same time that the interest in e-mail reference began in earnest. Interest in the use of desktop video conferencing also peaked in the mid 1990s, with pilot projects conducted at the University of Michigan, and at the University of California-Irvine. These two projects appeared to meet with limited success so video reference faded from view.

Chat-based technologies for reference services have emerged in the last two years and have really captured the imaginations of librarians. While there are many software packages to choose from, most offer co-browsing capability, enable the librarian to "push" Web pages to the user and provide full summaries of the transactions.

We can begin to wonder whether digital reference services will become yet more automated? One project to watch is the OPAL Project at the UK's Open University which is exploring the development of a fully automated online 24/7 reference service for students. The project will attempt to use agent-based architecture to create a generic "artificial librarian", capable of answering complex questions about library resources.(See: http://oulib1.open.ac.uk/wh/research/opal/intro.html).
Imagine R2D2 at the reference desk!

Higher education is also going through a sea change that could be a harbinger of things to come for libraries and librarians, both in terms of the collections they build and the communities they serve. With distance education on the rise, (according to the National Center for Education Statistics, enrollments in distance education classes have more than doubled, increasing from 753,640 in the 1994-'95 school year to 1,632,350 in 1997-'98), it is harder for college and university libraries both to define and then serve their primary clientele. If students can come from anywhere, the physical boundaries that separate institutions of higher learning from one another become meaningless. In the April 2001 issue of ***Computers in Libraries***, author Steve Coffman suggests further that "it is not hard to imagine the development of virtual libraries with well-selected electronic content coupled with online reference services to help students find their

way around. Schools would 'subscribe' to these libraries, just as they now subscribe to electronic databases. Instead of having a whole crew of reference librarians sitting at desks in the building, your reference librarians would be online where they could handle reference traffic from many institutions at once."

Who Needs Libraries?

The challenges for libraries and librarians remain, however. Though more and more users are online, study after study confirm that the Internet is complex and hard to use. An article in ***NewsFactor Network*** April 9, 2001 (http://www.newsfactor.com/perl/story/8806.html) revealed that the general public is becoming increasingly frustrated by slow and unproductive Web searches, and that breaking points are reached in as little as 12 minutes. This frustration, dubbed "internet rage," claimed that 71 percent of British Internet users have suffered from it at one time or another. The study, commissioned by WebTop, a British Web indexing company, goes on to point out that the sheer volume of information available on the Web -- and the slowness in accessing it -- causes a great deal of stress as users are becoming increasingly frustrated by irrelevant responses brought up by search engines. The study's author, Edward Kerr summarizes what many of us have personally experienced, that search engines " may produce thousands of results, but often these are full of links to useless information, advertising banners and promotional garbage, and not to the information the person is looking for."

In addition to causing frustration to users, the best search engines still cover only a third of the Web; the rest is "invisible" - hidden in databases that search engine spiders cannot penetrate. So librarians are needed more than ever to sift, sort, select and serve information.

One salient difference between libraries and their online information service counterparts is that the numerous web-based reference services search only the Internet, not the vast collections found in libraries nor the thousands of library online catalogs that describe and manage those collections. Libraries, with their vast collections of artifactual knowledge, host inestimable opportunities for information mining. For just as the Internet is growing -- more than 1 billion pages and counting -- so, too are libraries. According to Bowker Annual 2000 more than 806 million volumes are housed in academic libraries in the United States alone. Moreover, of these 806 million, 449 million are unique and only available in one particular library. These are entire works, not single pages or journal articles and these figures do not include non-print format materials which are also increasing in number.

In addition, libraries are stocked with reference staff who have carved out areas of subject specialization often built upon years of academic study and personal experience. Let's face it, there is no substitute for the daily practice of sitting at the reference desk and fielding questions that can come from anywhere and cover just about anything.

Libraries Must Build on Traditional Strengths

Libraries are different from the Internet in a number of other ways. For example, librarians organize information using controlled vocabularies and other standard tools to make materials accessible. Librarians evaluate materials according to documented policy statements and

guidelines before selecting them. Library collections are unlimited in scope and include print, non-print and digital formats. Patrons can now conduct research and ask questions in person, in writing, by phone and fax, and online by email and there is a plethora of the aforementioned "live chat" software programs to choose from. The hallmarks of libraries, structure and organization, in-depth subject expertise, community-vetted standards and best practices and analog collections enable libraries to complement the universe of unstructured and unverified information on the Internet. By so doing, librarians can bridge the gulf that exists between providers and users of information.

The Collaborative Digital Reference Service (CDRS), launched by the Library of Congress in the spring of 2000, provides professional reference service to researchers anytime anywhere, through an international, digital network of libraries and related institutions. With a growing membership of more than 100 libraries, CDRS enables libraries to help each other serve all of their users, no matter where the users are.

CDRS combines the power of local collections and staff strengths with the diversity and availability of libraries and librarians throughout the world, 24 hours a day, 7 days a week. All reference, all the time .... always a librarian available to provide answers to questions and connect patrons to the resources they need when they need it. The power of CDRS was made evident recently when a patron submitted a query to CDRS through his local public library and was helped by a language specialist at a university library who provided a transliteration of a Saudi place name ... all within a matter of hours. The patron was thrilled to learn that through CDRS he had access to some of the world's most premier libraries and collections.

How Does CDRS Work?

The Library of Congress began building CDRS in the spring of 2000. From the beginning, libraries of all types -- special, academic, public and national -- joined the effort to help shape and define CDRS. The collaboration has been enormously beneficial on many levels as each library brings its special experience, knowledge of user behavior and needs, and subject expertise to bear on the project.

CDRS includes two component parts: submission of question and answer, and archiving of the answer for future use. The workflow looks like this: An end user requests information through a CDRS member institution. The member institution sends the query to the online Request Manager (RM) software for processing and assigning. The RM searches a database of CDRS Member institution profiles looking for the member institution best suited to answer the question. Matches are made on the basis of such data elements as hours of service, including time zones, subject strengths, scope of collections, types of patrons served, etc. The "match making" happens in milliseconds. Once a match on an institution has been made, the query is sent to that institution for answering. After the query has been answered, it is routed back to the original CDRS requesting library via the RM to allow for closing out the case and completing other administrative tasks.

The library profile is the core of the routing and assignment activity, and each institution can "code" itself as broadly or as narrowly as it chooses. Library profiles contain basic information

about the library including hours of service, collection strengths, staff strengths, education levels served, languages covered, geographic location of users served, whether there are special services provided and what they are -- as many as 28 data fields. This information is captured in a table where it is used by the online RM to sort, assign and track incoming questions and to deliver answers to the end user that are edited and stored in a separately searchable knowledge base of information. The knowledge base, to be populated with the diverse and authentic information provided by CDRS librarians, will ultimately serve as a front end to CDRS, designed to "catch" and answer incoming questions if there is a ready match. If there is no match on the knowledge base, the question will be routed through the RM and assigned to a library. Further, the profile tool is flexible enough to allow for regular updating to reflect staffing changes or special circumstances that would affect the automatic routing by the RM. For example, if the astronomy specialist is on sabbatical for several months and no back-up is available, the library might choose to remove that subject strength from its profile until the staff member returns.

*The illustration diagrams the work flow process.

If you build it, will they come?

16 libraries began the journey to build CDRS and defined the business rules and concept of operation by which CDRS would be created and implemented. For example, we agreed that: CDRS is a membership model; CDRS builds its infrastructure once and shares that "cost" among its members so all can afford to use the service; CDRS members need only Internet access, a browser and email to use it; quality is number one and policies, certification and Service Level Agreements (SLAs) are enforced to ensure that the brand lives up to the market's expectations; the technology platform is built to serve the membership as a whole; and CDRS is an international service that does not provide preferences to certain jurisdictions or members.

The implementation process began by initiating a series of pilot tests of the technical solutions. Pilot 1 had two principal goals: to test the effectiveness of the library profiles and to test a web form for submitting questions. In Pilot 2, we added more institutions worldwide, increased the number of questions asked of the system, revised the profile database, and began to experiment with software packages to serve as the Request Manager. On the administrative end of the project, we began to develop a variety of SLAs, to identify staff training needs, and to identify the roles of a CDRS volunteer advisory board.

The first "live" question was posed on June 29, 2000. This reference inquiry – regarding ancient Byzantine cuisine -- was sent by EARL Ask-A-Librarian , a participating public library consortium in the UK. The request, received by the CDRS server at the Library of Congress in Washington, was matched based on subject matter, depth of detail, and time of day, and routed to the Santa Monica Public Library at 10:40 a.m. Several hours later, a list of five books was on its way to London. So the "test" worked and we were on our way. During its first month of "live" testing, the member institutions exchanged more than 300 questions, creating a virtual reference desk spanning three continents and 15 time zones.

Pilot 3, which began in the late fall of 2000 and will continue through the end of this calendar year, focuses on scaling up the workflow, determining the needs for manual and automated back-

up systems such as an "on call librarian," and developing and implementing the knowledge base. The "on-call" librarian will not only ensure that no question is lost in the system but will provide technical support if CDRS goes down. The knowledge base will enable us to capture and reuse content. We are pleased to announce that a prototype knowledge base is being tested and shows real promise as a ready reference tool.

From the beginning this has been a collaborative process in every sense of the word and the rapid development of CDRS owes a lot to the resourcefulness and prescience of its early adopters. The volunteer advisory board, comprised of representatives from member institutions, meets regularly to discuss policy and future directions. Business meetings are also regularly held to get feedback, to report on and solve work flow problems, to discuss training and performance measures and build esprit de corps. The CDRS home page posts general information and news links, information for members and project milestones. A list serve allows members to communicate freely and frequently with one another and get technical questions addressed.

The Whole is Greater Than the Sum of the Parts

I am often asked whether there are any restrictions on the types of libraries that can participate and the simple answer is that there are none. The aforementioned service level agreement defines the nature of the member library's relationship to the CDRS and that agreement is codified in the library profiles. Many types of agreements are possible and are limited or expanded depending upon the strengths or limitations of the individual library. For example, a library may agree to: ask and answer questions; only ask questions; ask or answer questions only during specified periods; serve as an editor for the knowledge base; or serve as the on-call library if the automatic request manager function is inoperable.

In addition to defining roles and responsibilities among the partner libraries, the service level agreements will ultimately be used to determine what it will cost a library to be a member of CDRS. The planners have been examining a variety of funding options with the goal of being as flexible as possible both to allow for the broadest participation among types of libraries and to ensure that no one library or group of libraries has to bear all of the costs of establishing and sustaining CDRS.

Beginning with the ALA mid-winter meeting in Washington in January 2001, the Library of Congress has been collecting data on the value of CDRS through a series of live interactive sessions and an online survey. This information has been invaluable to the planners of CDRS in that it affirmed support for CDRS and its mission to have credentialed experts provide high quality information, and affirmed a willingness to pay for such a service.

We have encouraged maximum flexibility in developing the many component parts of CDRS. For a library to want to participate in CDRS, CDRS has to be perceived to have value. Just as there are no "one size fits all" libraries, so too are there no "one size fits all" arrangements with CDRS. Libraries are structured and organized differently, they have different local audiences and they have different policies and procedures for ensuring quality control. It has to offer something that the library does not already have, e.g., adequate staff, extended hours of service, a subject strength, a special collection unique to a participating library that the whole collaboration

then has access to. When the participating library defines the terms of that value, that library will have greater incentive to make the arrangement work, for itself and for CDRS. Our job is to create the tools, the library then decides for itself how to make the relationship work.

So how is CDRS working for members? A recent informal survey of the membership confirmed that the members feel they benefit from participation in CDRS and in those instances where CDRS implementation has worked best, there has been strong management, reference staff and patron support for the service. Librarians believe that their patrons are benefitting from CDRS citing the high quality information that they received and would not have been able to provide from their own resources and the ability to offer the service rather than having to refer clients to other institutions where they may or may not get the information they need. Librarians also believe that they benefit as professionals both from the collegiality of the interchanges with other libraries and from the challenges questions sent to them often pose. They love having access to reference professionals and collections around the world that can help them provide the best information to their patrons. Librarians are interested, too in the learning process that comes with trying something new and they welcome the chance to rethink how they deliver reference services to their campuses and communities.

Where Do We Go From Here?

In January of this year, the Online Computer Library Center (OCLC) and the Library of Congress on behalf of its member libraries, signed a cooperative agreement to guide CDRS through its next phase of development. According to the agreement, OCLC will provide technical and development support to CDRS by: building and maintaining a database of profiles of participating institutions that will provide answers through CDRS; building and maintaining a question-and-answer database system that will enable CDRS participants to catalog answers and store them in a searchable and browsable database (knowledge base); and providing administrative support for CDRS, including marketing, registration of new members, training and user support. Together, the Library of Congress and OCLC expect to develop a viable model for a self-sustaining digital reference service and promote CDRS in the library community.

Currently, libraries participating in CDRS connect with other libraries on behalf of end users so that libraries can define the parameters, determine what works and what does not work and create a service that is scalable and maximally responsive to user needs. From the beginning, however, we have envisioned CDRS to be a service that will be available directly to end users. We recognize that many individuals never go to their local library but still need information. And we want them to benefit from the power of a network of libraries that is dedicated to providing 24/7 reference service anytime, any where. Over the next several months, CDRS will be developing a document delivery project to capture bibliographic information in the question/answer process that can be used to initiate an automatic interlibrary loan. This is the first step in building what we hope will be "one stop shopping" for reference and information services.

As we build CDRS, we are performing a number of behind the scenes analyses to ensure economic sustainability, such as creating a marketing plan to attract new customers and determining the most cost-effective means of administering the network. We are continually examining our technical solutions to ensure that we have the right ones to meet our mission, and

that the tools we have created are easy for librarians to use. As we look to expand globally, and become a true 24/7 service, there are many issues we must think through: language and literacy, service to local populations in their own language, acceptable Internet access and technical infrastructure support mechanisms for a constituency that is the world, cultural and political sensitivities, e-commerce and trade agreements that may affect pricing models. The solutions to these issues will determine the long-term success of CDRS.

Final Thoughts

In this paper, I have focused on the ways in which one group of libraries has used technology to link those in need with credible and accurate resources. CDRS is one of many experiments going on in the profession, innovative and creative projects designed to make information available faster and more effectively to meet more specialized demands.

Mark Twain would agree that reports of the death of libraries have been greatly exaggerated. Yet it is undeniably a watershed moment for our profession, a time to reinvent ourselves and to adapt our skills to the demands of the protean universe of information. At no other time in history has the emergence of technology affected so significantly the core mission of a library. These technological advances have created new opportunities for libraries, information managers, researchers and library patrons of all kinds. Indeed, the Internet has created a fundamental change in the way people collect information and acquire knowledge. Instead of a trip to the library, researchers turn first to the Internet. The challenge for librarians is to leverage the excitement, power and technology of the Internet to create resources and services that researchers will return to again and again.